

6BK5—12BK5—25BK5

BEAM PENTODE

DESCRIPTION AND RATING

The 6BK5 is a miniature beam pentode designed primarily for use in the audio-frequency power output stage of television and radio receivers in which only small driving voltages are available. Features of the tube include extremely high power sensitivity, high transconductance, and high plate efficiency.

Except for heater ratings and heater-cathode voltage ratings, the 12BK5 is identical to the 6BK5. The 12BK5, as a result of its controlled heater warm-up characteristic, is especially suited for use in television receivers which employ series-connected heaters. When the 12BK5 is used in conjunction with other 600-milliampere types which exhibit essentially the same heater warm-up characteristic, heater voltage surges across the individual tubes are minimized during the warm-up period.

The 25BK5 differs from the 6BK5 only in heater ratings.

GENERAL

ELECTRICAL

	6BK5	12BK5	25BK5	
Cathode—Coated Unipotential				
Heater Voltage, AC or DC	6.3	12.6	25.0	Volts
Heater Current	1.2	0.6	0.3	Amperes
Heater Warm-up Time*	...	11	...	Seconds
Direct Interelectrode Capacitances†				
Grid-Number 1 to Plate			0.6	μμf
Input			13	μμf
Output			5.0	μμf

MECHANICAL

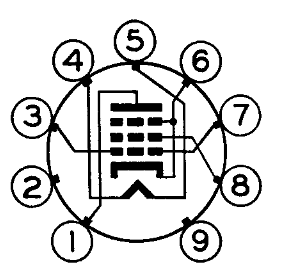
Mounting Position—Any
Envelope—T-6½, Glass
Base—E9-1, Small Button 9-Pin

MAXIMUM RATINGS

DESIGN-CENTER VALUES

	12BK5	6BK5, 25BK5	
Plate Voltage		250	Volts
Screen Voltage		250	Volts
Positive DC Grid-Number 1 Voltage		0	Volts
Plate Dissipation		9.0	Watts
Screen Dissipation		2.5	Watts
Heater-Cathode Voltage	12BK5	6BK5, 25BK5	
Heater Positive with Respect to Cathode			
DC Component	100	......	Volts
Total DC and Peak	200	100	Volts
Heater Negative with Respect to Cathode			
Total DC and Peak	200	100	Volts
Grid-Number 1 Circuit Resistance			
With Fixed Bias	0.1	0.1	Megohms
With Cathode Bias	0.5	0.5	Megohms

BASING DIAGRAM

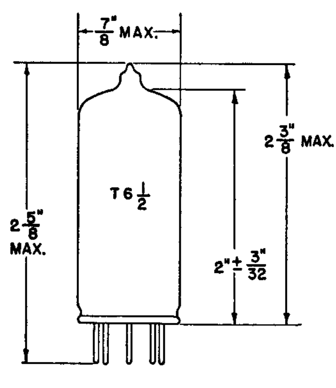


RETMA 9BQ

TERMINAL CONNECTIONS

Pin 1—Plate
Pin 2—No Connection
Pin 3—Grid Number 1
Pin 4—Heater
Pin 5—Heater
Pin 6—Cathode and Beam Plates
Pin 7—Grid Number 1
Pin 8—Grid Number 2 (Screen)
Pin 9—No Connection

PHYSICAL DIMENSIONS



RETMA 6-3



Supersedes ET-T799, dated 11-51

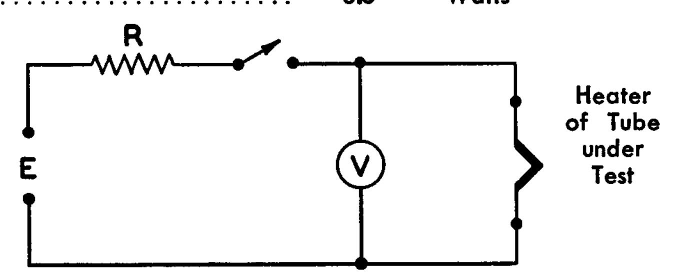
CHARACTERISTICS AND TYPICAL OPERATION

CLASS A_1 AMPLIFIER

Plate Voltage	250	Volts
Screen Voltage	250	Volts
Grid-Number 1 Voltage	−5.0	Volts
Peak AF Grid-Number 1 Voltage	5.0	Volts
Plate Resistance, approximate	100000	Ohms
Transconductance	8500	Micromhos
Zero-Signal Plate Current	35	Milliamperes
Maximum-Signal Plate Current, approximate	37	Milliamperes
Zero-Signal Screen Current	3.5	Milliamperes
Maximum-Signal Screen Current, approximate	10	Milliamperes
Load Resistance	6500	Ohms
Total Harmonic Distortion, approximate	7	Percent
Maximum-Signal Power Output	3.5	Watts

* Heater warm-up time is defined as the time required in the circuit shown at the right for the voltage across the heater terminals to increase from zero to the heater test voltage (V_1). For this type, E=50 volts (RMS or DC), V_1=10.0 volts (RMS or DC), and R=63 ohms.

† Without external shield.



AVERAGE PLATE CHARACTERISTICS

E_f = RATED VALUE
E_{c1} = 0 VOLTS

E_{c2} = 250 VOLTS
200
150
100

PLATE CURRENT IN MILLIAMPERES: 0, 20, 40, 60, 80, 100

PLATE VOLTAGE IN VOLTS: 0, 100, 200, 300, 400, 500

AVERAGE PLATE CHARACTERISTICS

E_f = RATED VALUE
E_{c2} = 250 VOLTS

I_b @ E_{c1} = 0 VOLTS
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10
-12
I_{c2} @ E_{c1} = 0 VOLTS
-5.0

PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
0 20 40 60 80 100

0 100 200 300 400 500
PLATE VOLTAGE IN VOLTS

AVERAGE TRANSFER CHARACTERISTICS

E_f = RATED VALUE
E_b = 250 VOLTS

E_{c2} = 250 VOLTS
200
150
100

PLATE CURRENT IN MILLIAMPERES
0 10 20 30 40 50

-14 -12 -10 -8 -6 -4 -2 0
GRID NUMBER 1 VOLTAGE IN VOLTS

E_f = RATED VALUE
E_b = 250 VOLTS

E_{c2} = 250 VOLTS
200
150
100

SCREEN CURRENT IN MILLIAMPERES
0 4 8 12 16 20

-14 -12 -10 -8 -6 -4 -2 0
GRID NUMBER 1 VOLTAGE IN VOLTS

OPERATION CHARACTERISTICS

E_f = RATED VALUE
E_b = 250 VOLTS
E_{c2} = 250 VOLTS
E_{c1} = −5.0 VOLTS
E_{sig} = 3.54 VOLTS (RMS)

POWER OUTPUT

TOTAL HARMONIC DISTORTION

POWER OUTPUT IN WATTS: 0, 1, 2, 3, 4, 5

TOTAL HARMONIC DISTORTION IN PERCENT: 0, 5, 10, 15, 20

LOAD RESISTANCE IN OHMS: 0, 2000, 4000, 6000, 8000, 10000, 12000, 14000